

This material may be protected by  
Copyright law (Title 17 U.S. Code)

# A history of Galileo's Inclined Plane Experiment and Its Philosophical Implications

Paolo Palmieri, University of Pittsburgh

St John's College, 09/09/2011

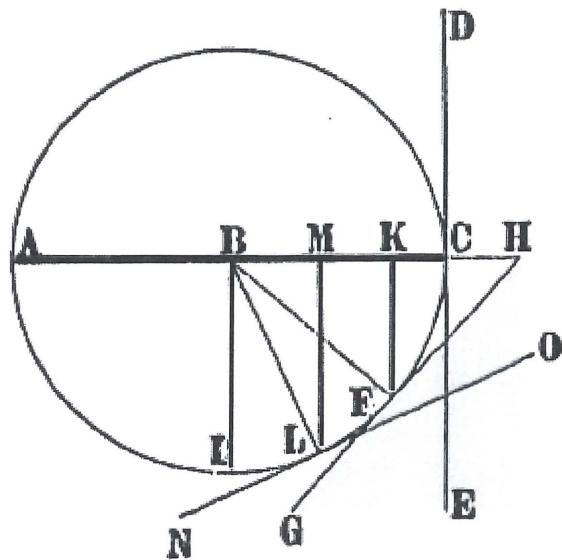
# Galileo had a life-long adventure

...with balls rolling down wooden beams. I call that adventure Galileo's inclined plane experiment. *The lecture is a concise history of Galileo's inclined plane experiment, accompanied by philosophical reflections on its implications.*

# Late medieval natural philosophy: The Juvenilia writings

- degree of quality
- intension and remission processes
- parts of quality accumulated not corrupted
- intension occurs by production of new quality:  
prior part remains while the subsequent part  
comes into being
- four prime qualities, revealed by sense of touch

# Galileo's early work: De motu writings

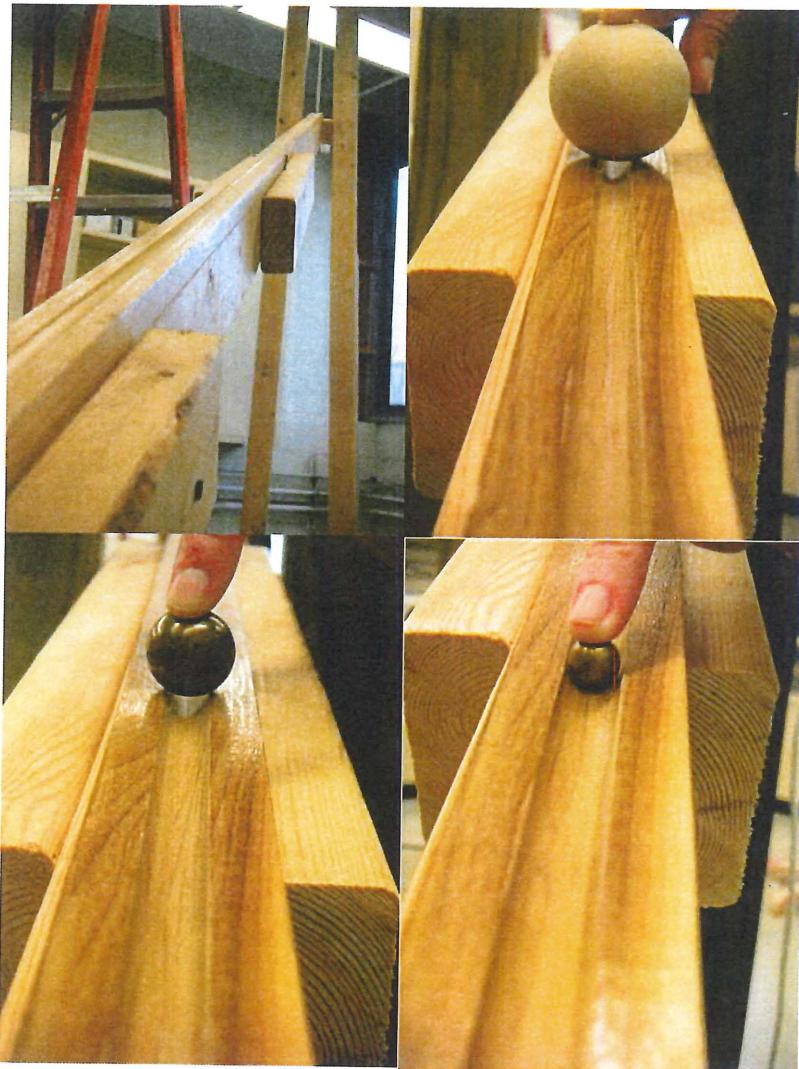


- individuality (*De motu*) vs. scribal anonymity (*Juvenilia*)
- inclined plane: statics

# Vincenzo Galilei and ancient music theory

- psychoacoustics workshop
- according to Aristoxenus, in the Renaissance Latin text, pitch was “tension” of voice, namely, a distinct element of voice that is neither intension nor remission of voice
- Aristoxenus’ musical science phenomenalistic
- Vincenzo experimented with vases, coins, and small copper bells which, though exactly the same in shape and size, differ more than a tone in pitch when struck
- ... sign, he concludes, that it is perfectly possible that an octave will be generated by bodies which do not have any privileged physical property expressible in ratios of integers

# unusual sounding bodies: sounds of the plane



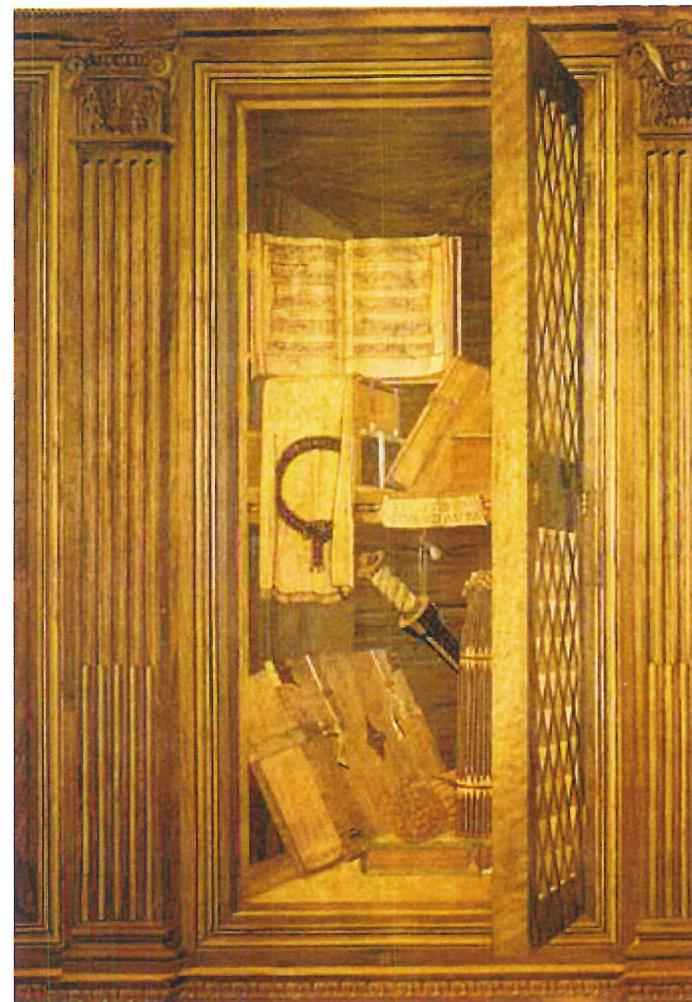
- microtones of speed
- Incline plane works like an acoustic microscope
- degree of speed/sound increases continuously

# A pragmatist approach to the history and philosophy of science

The work of Galileo was not a development, but a revolution. It marked a change from the qualitative to the quantitative or metric; from the heterogeneous to the homogenous; from intrinsic forms to relations; from esthetic harmonies to mathematical formulae; from contemplative enjoyment to active manipulation and control; from rest to change; from eternal objects to temporal sequence (John Dewey)

# Galileo's epistemological self-consciousness

- Galileo always concerned with the experience of poetry
- Rejection of Tasso / Ariosto superior
- Why so?





One of the most common defects of Tasso:  
cobbled together fragmented concepts  
lacking continuity and reciprocal dependence,  
so that his narrative turns out to be a sort of  
marquetry, inlaid work in wood, rather than  
an oil painting...

This technique explains why the figures of  
marquetry remain dry, approximate, and with  
no relief, whereas in oil painting transitions  
can be made smooth [*sfumate*], so that the  
painting acquires the qualities of tenderness,  
roundness, and forceful relief.

# Reflections the history and philosophy of science

Galileo's sonnet (ca. 1640).

## *Enimma*

Mostro son io più strano e più difforme  
Che l' arpia, la sirena o la chimera;  
Nè in terra, in aria, in aqua è alcuna fiera,  
Ch' abbia di membra così varie forme.  
Parte a parte non ho che sia conforme,  
Più che s'una sia bianca e l' altra nera;  
Spesso di cacciator dietro ho una schiera,  
Che de' miei piè van ritracciando l'orme.  
Nelle tenebre oscure è il mio soggiorno;  
Chè se dall' ombre al chiaro lume passo,  
Tosto l' alma da me sen fugge, come  
Sen fugge il sogno all' apparir giorno;  
E le mie membra disunite lasso,  
E l' esser perdo, con la vita, e 'l nome.

Translation (by Dennis Looney)

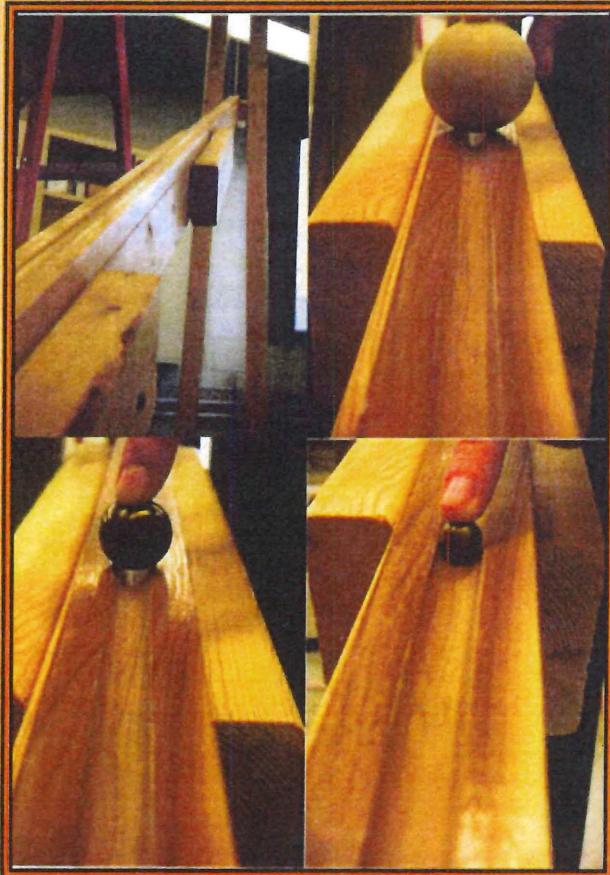
## *Enigma*

Monster am I, stranger and more misshapen  
than the harpy, the siren, or the chimera.  
There is not a beast on land, in air or water  
whose limbs are of such varied forms.  
No part of me is the same size as any other part;  
what's more: if one part is white, the other is black.  
I often have a band of hunters behind me  
who map out the traces of my tracks.  
In the darkest gloom I take my rest,  
for if I pass from the shadows to bright light,  
quickly the soul flees from me, just as  
the dream flees at the break of day.  
And I exhaust my discombobulated limbs  
and lose my essence, along with life and name.

# A pragmatist approach to the history and philosophy of science

- A physiologist may for his special purpose reduce Othello's perception of a handkerchief to simple elements of color under certain conditions of light and shapes seen under certain angular conditions of vision. But the actual experience was charged with history and prophecy; full of love, jealousy and villainy, fulfilling past human relationships and moving finally to tragic destiny (John Dewey)

A HISTORY OF GALILEO'S  
INCLINED PLANE EXPERIMENT  
AND ITS PHILOSOPHICAL IMPLICATIONS



More in...